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Original Research

Relation between coronary angiographic findings and carotid intima-media thickness

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ABSTRACT:

Background: Carotid intima-media thickness (CIMT) refers to the measurement of the thickness of the inner two layers of the carotid artery wall—the intima and the media. The present study was conducted to assess relation between coronary angiographic findings and carotid intima-media thickness. **Materials &Methods:** 72 patients with stable angina pectoris of both genderswere divided into 2 groups of 36 each. In group I, patients were without a noncritical coronary lesion, and in group II, patients were having at least one lesion more than 50% within the main branches of the coronary arteries. All of the patients underwent carotid doppler ultrasound examination for measurement of the CIMT. **Results:** Smoking was present in 54% in group I and 67% in group II and hyperlipidemia was seen in 18% in group I and 56% in group II, diabetes was present in 50% in group I and 61% in group II and hypertension was seen in 36% in group I and 47% in group II. The difference was significant (P< 0.05). The mean carotid artery thickness in group I was 0.76 mm and in group II was 1.8 mm. The difference was significant (P< 0.05). The major risk factors for coronary artery diseasewas CIMT (>1 mm) (P- 0.02) and hypertension (P- 0.05). **Conclusion:** Increase in CIMT was associated with the presence and extent of coronary artery disease.

Key words: coronary artery disease, Hypertension, Intima

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INTRODUCTION

The primary cause of death in the globe is cardiovascular disease. In atherosclerotic disease, an advanced state of involvement is frequently present at the time that clinical signs first appear. Before the development of clinical symptoms, the artery wall experiences numerous major changes, including endothelial dysfunction and an increase in intima-media thickness. These alterations can aid in the early detection of atherosclerosis.In western literature, migrant Asian Indians have been found to have high prevalence rates of early coronary artery disease (CAD).[1]

Carotid intima-media thickness (CIMT) refers to the measurement of the thickness of the inner two layers of the carotid artery wall—the intima and the media. It is typically assessed using ultrasound imaging.IMT measured by B-mode ultrasound in extracranial carotid arteries, whether in a single segment (common carotid) or in multiple segments (aggregation of measures in common carotids, bifurcations, and internal carotids), is a useful indicator of coronary risk status and a predictor of ensuing coronary heart disease (CHD), according to numerous studies.[1,2]

The carotid arteries are major blood vessels located in the neck that supply oxygenated blood to the brain. CIMT measurement is a non-invasive method used to evaluate the health of the carotid arteries and assess the presence and progression of atherosclerosis, which is the buildup of fatty deposits (plaque) in the arterial walls.[3]During a CIMT examination, an ultrasound probe is placed on the neck, and high-frequency sound waves are used to create images of the carotid arteries. The intima and media layers of the artery walls are visualized, and their thickness is measured.[4] The measurement is typically taken at multiple points along the carotid arteries, and the average thickness is calculated.CIMT measurement provides information about the extent of atherosclerosis and can be used as a marker of cardiovascular disease risk.[5] Thicker carotid artery walls are associated with an increased risk of heart attack, stroke, and other cardiovascular

events. The present study was conducted to assess relation between coronary angiographic findings and carotid intima-media thickness.

MATERIALS &METHODS

The present study comprised of 72patients with stable angina pectoris of both genders. Ethical review committee permission was obtained. Patients' written consent was obtained before starting the study.

Data such as name, age, gender etc. was recorded. All patients were subjected to coronary angiography. Based on it, patients were divided into 2 groups of 36 each. In group I, patients were without a noncritical coronary lesion, and in group II, patientswere having at least one lesion more than 50% within the main branches of the coronary arteries. All of the patients underwent carotid doppler ultrasound examination for measurement of the CIMT. The CIMT was measured 1 cm distal to the bulbus over a length of 1 cm of both carotid arteries. The results were compiled and subjected for statistical analysis. P value less than 0.05 was set significant.

RESULTS

Table I Baseline characteristics

Parameters	Group I	Group II	P value
Smoking	54%	67%	0.05
Hyperlipidemia	18%	56%	0.04
Diabetes	50%	61%	0.05
Hypertension	36%	47%	0.03

Table I shows that smoking was present in 54% in group I and 67% in group II and hyperlipidemia was seen in 18%in group I and 56% in group II, diabetes was present in 50% in group I and 61% in group II and hypertension was seen in 36% in group I and 47% in group II. The difference was significant (P< 0.05).

Table II Assessment of carotid artery media thickness

Groups	Mean (mm)	P value
Group I	0.76	0.02
Group II	1.8	

Table II shows that the mean carotid artery thickness in group I was 0.76 mm and in group II was 1.8 mm. The difference was significant (P< 0.05).

Table IV Risk factors of coronary artery disease

Parameters	P value	Odd ratio
CIMT (>1 mm)	0.02	4.0
Diabetes	0.71	0.91
Hypertension	0.05	2.3
Hyperlipidemia	0.8	1.6

Table III shows that the major risk factors for coronary artery disease was CIMT (>1 mm) (P- 0.02) and hypertension (P- 0.05).

DISCUSSION

CIMT is often used in research studies and clinical trials to evaluate the effectiveness of interventions aimed at preventing or reducing atherosclerosis. It is also sometimes used in clinical practice as an additional tool for assessing cardiovascular risk, particularly in individuals who may be at intermediate risk based on traditional risk factors.Carotid intima-media thickness (CIMT) measurements have increasingly been used in observational and intervention studies.[6] CIMT has been applied as an outcome variable in studies on the determinants of atherosclerosis, and it has been employed as an exposure variable in studies on the prognostic value of CIMT in order to predict coronary artery disease (CAD) and stroke. Change in CIMT over time act as a marker for atherosclerosis progression.Cardiovascular disease is the primary cause of death, morbidity, and medical expense.[7] The majority of research have used coronary angiography or a variety of substitute clinical CAD markers to assess carotid IMT thickness. There are few studies connecting CT coronary angiography findings with carotid IMT.[8]However, it's important to note that CIMT measurement is not widely recommended as a routine screening test for the general population. The American Heart Association and other organizations have not established specific guidelines regarding the use of CIMT in clinical practice. The measurement is considered more investigational and is primarily used in research settings or in select cases where additional cardiovascular risk assessment is deemed necessary by healthcare professionals.[9]The present study was conducted to assess relation between coronary angiographic findings and carotid intima-media thickness.

We found that smoking was present in 54% in group I and 67% in group II and hyperlipidemia was seen in 18% in group I and 56% in group II, diabetes was present in 50% in group I and 61% in group II and hypertension was seen in 36% in group I and 47% in group II. As determined by angiography (n = 33) or intravascular ultrasonography (n = 1), 30 of the 34 investigations on the association between CIMT and coronary atherosclerosis showed a modestly positive relationship; the degree of this link was comparable to that seen in postmortem studies. This finding was made by Bots et al.[10] 17 of the 18 studies on CIMT and CV events demonstrated graded favourable correlations. Only one study has so far provided data on the connection between changes in CIMT and potential CV events, demonstrating an elevated risk with CIMT progression.

We found that mean carotid artery thickness in group I was 0.76 mm and in group II was 1.8 mm. We found that the major risk factors for coronary artery disease was CIMT (>1 mm) (P- 0.02) and hypertension (P- 0.05).One hundred consecutive patients with stable angina pectoris were included in Coskun et al's[11] investigation. According to the results of the coronary angiography, the patients were split into two groups: group 1 (39 patients) had no noncritical coronary lesions, and group 2 (61 patients) had at least one

lesion that covered more than 50% of the main branches of the coronary arteries. A radiologist who was blind to the angiographic results performed a carotid Doppler ultrasonography examination on each patient in order to measure the CIMT. In Group 1, the mean CIMT was 0.78 0.21 mm, whereas in Group 2, it was 1.48 0.28 mm (p = 0.001). The mean CIMT was considerably higher in patients with left main coronary artery disease, many vessels, and single vessel disease.

CONCLUSION

Authors found that increase in CIMT was associated with the presence and extent of coronary artery disease.

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